Chiton pallasii Middendorff, thus displacing the more familiar *Amicula* (auct. not Gray, 1847) for that group.

Lepidochitona Gray, supersedes *Trachydermon* as indicated by Iredale (Proc. Mal. Soc. London, XI, p. 127, 1914). With the first mention of the latter genus Carpenter associates only two species, *C. pseudodentiens* Cpr. (=*dentiens* Gould) and an undescribed *C. gothicus*. The former must therefore be taken as type, instead of *flectens*, though they are really congeneric. As type of *Lepidochiton* Carpenter, I select his first species, *C. lividus* Midd., which is an *Ischnochiton*, but Carpenter apparently regarded it as synonymous with *Leptochiton*, to which he refers the species in his index of 1872. Pilsbry refers the species, in the order above cited, respectively to *Ischnochiton, Lepidozona, Ischnochiton*, and *Ischnoradsia*. The genus would best be considered a synonym of *Ischnochiton*, especially as no one seems to have quoted it after Carpenter, and he did not clear it up in his MS.

In regard to *Leptochiton*, I am inclined to agree with Berry that the west coast and Arctic forms are so different from the typical *Lepidopleurus cayetanus* that a sectional separation is appropriate.

CAMPING IN THE SIERRAS AND THE DESERT. PLATE I.

BY JAS. H. FERRISS.

Late in June of last year, facing westward I departed from the home snailery in search of adventure, and returned about the first of May this year.

At the Grand Canyon of the Colorado a couple of very warm days was devoted to the Bright Angel trail, digging vainly for *Sonorella betheli.*

The Vernal Falls, Yosemite Valley, California, offered another opportunity, with a yield of three Epiphragmophoras, one of these the *E. hillebrandi yosemitensis*, discovered there by Mr. Herbert N. Lowe. This was the opening of another season of delight in the California mountains. For nearly a

month we camped with the Sierra Club at the Tuolumne Meadows, making side trips from there in search of snails and other kinds of trout. Then eastward with our own pack train for more than another month over the high passes, with a side trip to Silver Lake, down into the branches of the San Joaquin, and over the John Muir Pass to the Middle Fork of the Kings River. At Tehipite valley we left the Middle Fork, westward crossed the North Fork, and hit the main river at Trimmer, where we left our mules and took the auto stage for Sanger and Fresno.

Out for health, and in no hurry, the opportunities for collecting were the best. The high altitudes, glaciers and snow banks were another world. In the valleys, with a wealth of flowers, birds, and trout, and the grandest scenery upon the continent, we rested several days at every camping place, as a rule. At Palisade creek we halted nearly a week and had golden trout for every meal.

But the snails were small, and few in number of specimens and species. Riding up the zigzag out of the Tehipite valley the silvery track of a snail was found on the trail, and in half a day I dug up a dozen Epiphragmophoras, looking like *E. traski*, the only large shell found since leaving the Yosemite. Like a Sonorella, they were living in a pile of rocks well covered with leaves and rotten wood.

Between trips we hunted up old friends and collections. Some of these were mail-order friends of long standing, and we were greatly pleased to see what they looked like. At Berkeley it was the Alaska bear skins, H. S. Swarth and Robert Grinnell. At Oakland, Fred L. Button, who gave us a two-night exhibition of his shells. At the Academy of Sciences, Golden Gate Park, Barton W. Evermann and the Henry Hemphill collection of western land shells. At the Leland Stanford University, Mr. and Mrs. Oldroyd and the Hemphill duplicates. At Los Angeles, the fossil bones from the asphalt beds. The collections and the collectors demonstrate the California spirit, and were far beyond our expectations.

Tucson likewise, Thornber, Cummins, Voorhies and Taylor at the University of Arizona, McDougal and Shreve at the

Carnegie Desert Laboratory are "live wires" in the natural sciences. Also explorers. Exploring begets good health, and good health begets enthusiasm. Also, Arizona is apparently the head center of natural history, so many species in botany and zoology have their beginning here. By the way, a newspaper reporter at Tucson gave us a reputation for the discovery of 650 new species of snails in Arizona! In figures it is well to give out type-written copy to the press. Then no embarrassing apologies to university clubs will be needful.

To eliminate a limp which interfered with snail-catching more and more, I went into a hospital at Tucson, and a month or two was taken out of this great vacation; but on the whole a large collection was made. With mules for the high desert ranges and a Ford for the smaller ones, one in the convalescent stage may make a good showing. Some of the hills are only 150 feet in height, and with a level desert floor we could almost collect from the machine. At one point it was not more than ten feet from snails to Ford. We seldom walked ten miles in one day, for with the larger mountains and their long and rough mesas we could ride within a half-mile of the snails.

Within the recent geologic period apparently there was a heavy rainfall (Noah's perhaps), so heavy that the large boulders were thrown out upon both sides of the channel, and thus these gulches are often heavily diked on the lower slopes of the mountain. These dikes are often the best collecting grounds, especially in dry weather; the fortifications of five or six feet in depth and twenty wide are easily explored. To catch a live snail at home in some of the larger slides higher up, a steam shovel and a full equipment of quarrymen is needed.

On horseback, with Frank Cole as guide, a trapper, hunter, prospector, forester, now a good snail-hunter and a wonderful cook, I made another trip through the Catalinas and Rincons, finding more of the rough-barked Sonorellas. Then into the Galuras, where we captured a smooth-bark *Sonorella* with a diameter of 32 millimeters. At Tucson my partner on the California trips and many others joined the party for a winter

in the desert. To her it seemed a dreary prospect, but a short trip into the Tucson range with its mesas forested with orchard-like trees and giant cactus, the ever-changing botanical societies, wild pigs, deer, mountain sheep, quail and very toothsome cottontails, told another story. The desert was as interesting as the mountains, and the weather in winter was summer-like without excessive heat or annoying insects. With extra tanks of gasoline upon our running-board, any place was home, the tent a parlor, and auto cushions a mattress. There was no lack of firewood or water.

The Tucson range, only an hour or so from the city, was particularly home-like. The first day in camp, Cole brought in a wild pig and baked it. With hot biscuit and steaming coffee, and the fruit and goodies brought from town, we had such a Christmas dinner, with surely as good an appetite, as in ye good old days, and it was on Christmas day. And, too, in a dining hall with columns and arches of living green, with prickers so long an unruly guest would not scratch the varnish. Our mistletoe decorations were generous, for there are eleven species and varieties in Arizona. Here we found our largest catch in Sonorellas, the rare fern *Cheilanthes pringleyi* and the most beautiful member of the fish-hook group of cactus, *Echinocactus lecontei.* From our camps westward towards the Silver Bell range, twenty miles away, it was a thick forest of the giant cactus, paloverde, mesquite and iron wood as far as the eye could see. Cole brought in a good pair of mountain sheep horns laid out by some lion or wolf about a year ago, and I dug up a nice diamond rattler the second day out. There are eleven species and varieties of rattlers in this state also.

We made seven camps on the west side of the range—Pictured Rocks, Rattler, Sheephorn, Wild Pig, Twin Cacti (Plate I), Cat Mountain and Limekiln. Sonorellas were found at 37 stations in five weeks. I worked about half time.

We also gave about the same amount of time to the ranges west, going as far as Ajo, and then I was in trim to work full time. These mountains west of the city of Tucson rise from a lower level than the Catalinas, Santa Ritas and the ranges

eastward. The higher peaks are supposed to run up to 8,000 feet above the sea. Very few are named, and so far as we could learn none have been surveyed. The Baboquivari system starts at the Mexican line and runs a little west of north. As the Baboquivaris, they are 40 miles in length, then known as Coyotes for 7 miles, as the Roskruge 20, as the Abbie Waterman 10, and as the Silver Bell 10 miles. We hit only a few high spots in the first three, and I collected at one small slide in the latter.

On the road to Ajo we had good success in Sonorellas in the small hills along the Comovo route, and here we first saw the organ cactus and the crucifix tree. Around the Ajo mountains—Wall's Wells and Montezuma Head—and the several nearby ranges, we were unable to find any traces of Sonorellas. The last Sonorella station west was at a small group of hills where the sign board of the Interior Department read "Tucson 101 miles". Beyond that the basalt rocks were covered with white dust that may have been alkali, or the granite had a face so sharp and dry the snails on a hike would require tennis shoes and a canteen. A mining prospector afterwards told us shells were to be found near the south end of the Big Ajo range where there was a small spring and walnut trees, and that they were also in the Mesquites, a range near the Mexican border. We anticipated a change in conditions, and perhaps Mexican or new groups of snails, and we still feel that something may be found in this field—perhaps in the Mesquite and border ranges, or in the Growlers, a forty-mile range west of Ajo—when the Mexican bandits are a little less active among the southern cattle ranges.

On the back track we returned by way of the Covered Wells and White Wells crossing the Quijota range, but found only a few Pupas, Succineas, and other small ones until we camped near some abandoned silver prospects in the southern end. We hunted the placer holes for rattlers without success but found a tiger rattler and Sonorellas in the rocks. We also had further luck in the foot-hills at the southern end of the Cababi range, where Mr. Cole had found Sonorellas in 1914.

Nearly all of this western half of Pima County is occupied

by the Papago Indians. Their horses, cattle, corn and wheat fields, and villages are numerous, and we were under many obligations to them for their good wells. Converted by the Catholic Fathers some three hundred years ago, and with the assistance of the Presbyterians since, they have become an industrious people, fat and very rich. Their housing is not pretentious, as with wealthy white men, but evidently sanitary, for the male in weight averages about 260 and his helpmeet about 180. The white men covet the Papago's grass and browsing, and would like a mix-up; but Uncle Sam at present is plainly giving the Indian a square deal.

Between the Tucson Range and the Ajo we collected at 55 stations, sampling the hills here and there. Other expeditions were made to the Serritas, to the Rosemont and Greaterville mining districts on the east side of the Santa Ritas, and to the Empire and Mustang Ranges on our way to visit old friends in the Huachucas. A. F. Berner, an old friend of the botanists and snail hunters, was found in hard luck. He is now blind and has been confined to his bed with rheumatism for two years. The entomologist, Biedermann, is more fortunate. He has been remarkably successful with beetles and moths, and he is now an acknowledged leader in grafting. With 99 per cent success he has made the Carr Canyon walnuts produce the best of European walnuts, and the Black Hamburgs are now picked from the wild vines of his homestead. He hopes to exhibit home-grown chestnuts in another year, from the mountain oaks. They do it in France. Happy Jack is a prosperous merchant on the Ocean-to-Ocean auto way.

In the Empire Range, draining into the Santa Cruz River, and the Mustangs, draining into the San Pedro, we found both *Holospira* and *Oreohelix* as well as *Sonorella*. Here was further evidence of ancient "Noah flood" mischief. Deep in the clay of the gulches of the Mustang slopes were Sonorellas and Oreohelix, not to be found alive, or mixed in with the species now living. I worked hard a day and a half to find them alive or freshly dead, but other peaks and gulches had only subfossils of their kind. A like condition existed along the Bright Angel trail in the Grand Canyon. Since my former

visit floods had cut the clay banks and turned up a subfossil species of *Oreohelix* not now found alive on the south rim.

Thus ends my longest adventure, and perhaps the most fruitful. Collections were made at 187 stations, and with something over 140 sets of duplicates thrown into the basket by generous California friends, we will have about 500 separate lots to check up and discuss later.

Joliet, Ill., June, 1918.

NEW VARIETIES OF NAIADES FROM LAKE ERIE.

BY N. M. GRIER.

While the general distinction between the Naiades of Lake Erie and their parent forms of the Ohio drainage have already been commented upon by Walker, (1) representatives in Lake Erie of at least three of the parental forms have never been given the varietal distinction they deserve. The parent species following the nomenclatorial changes proposed by Frierson (2) and Vanatta (3) are *Fusconaia flava* (Raf.), *Elliptio dilatatus* (Raf.), and *Symphynota* (*Lasmigona*) *costata* (Raf.). The comparisons between them and their Lake Erie representatives were made with the aid of Simpson's Descriptive Catalogue.

ELLIPTIO DILATATUS var. STERKII, new variety.

Differs from typical *dilatatus* by its smaller size, less elongated and proportionately higher shell. Always inflated, not so pointed posteriorly. Ventral line rather straight, beaks more anterior in position. Epidermis in *dilatatus* dark brown and horn or yellowish, surface usually with uneven growth lines. In *sterkii*, epidermis always smooth or polished, light olive green to yellowish brown to reddish brown. Nacre in *dilatatus* mostly dark purple, salmon and white; that of *sterkii* is lavender, light reddish purple, pearl-blue.

The following table gives maximum, minimum and mean dimensions of 52 shells each of parent and variety: